

Application Serial No. 10/750,347

Amendment Dated: June 8, 2007

Response to First Office Action of March 8, 2007

REMARKS/ARGUMENTS

I. INVENTION OVERVIEW

A freeze tolerant fuel cell power plant includes a direct contact heat exchanger by-pass system for directing flow of a water component of the coolant directly from a coolant loop of the plant directly through a radiator and back to the coolant loop without passing through a direct contact heat exchanger. The by-pass system also restricts flow of a water immiscible fluid of the coolant through the radiator and coolant loop. The accumulator and direct contact heat exchanger cooperatively serve to resist freezing of the plant during shut down, start up and operation in sub-freezing ambient conditions. However, in operation of the plant in near steady state and/or warm conditions, the water immiscible fluid is not needed, and the direct contact heat exchanger by-pass system serves to isolate the direct contact heat exchanger and water immiscible fluid so that only the water component of the coolant is directed to flow directly between the fuel cell coolant loop and the radiator to enhance efficient cooling of the water component and efficient plant operation.

In particular, the direct contact heat exchanger by-pass system facilitates usage of the water component of the coolant whenever the plant experiences a high heat rejection demand, such as whenever the ambient temperatures are in excess of 30 degrees Celsius ("°C"). Water has a higher thermal rejection capability than the water immiscible fluids appropriate for coolants in the power plant. Therefore, the by-pass system

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provides for use of the water component of the coolant as the heat rejection coolant during periods of high heat rejection requirements, while isolating the water immiscible fluid coolant out of the radiator and coolant loop.

II. RESPONSE TO OFFICE ACTION

This response to the First Office Action of March 8, 2007, will address the concerns raised by the Examiner in that First Office Action in the order in which they appear in the Action. The undersigned express his sincere appreciation to the Examiner for her generous expenditure of time during a telephone interview of June 7, 2008 to discuss the Applicants' approach in the above amendments to the claims, and related matters.

First, at page 2, sections 1 and 2 of the First Office Action, the Examiner has rejected claims 1 - 5 and 11 - 13 under 35 U.S.C. Section 112, second paragraph, as being indefinite because the phrases "water coolant" or the word "coolant" could be interpreted to mean that there is a coolant to cool the water. The Examiner has suggested replacing the phrase "water coolant" and the word "coolant" with the phrase "water component". Applicants' accept the Examiner's position, and by the present Amendment to claims 1 - 5 and 11 - 13, the Examiner's suggested amendments have been made.

Next, at sections 3 - 4 of the First Office Action, the Examiner has rejected claim 1 under 35 U.S.C. Section 101 as claiming the same invention as that of claim 10 of prior U.S. Patent No. 7,090,940 (hereafter "the '940 Patent"). In

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particular, the Examiner urges that elements (a), (b) and (c) of pending claim 1 are identical to the same elements of claim 1 of the '940 Patent. This is essentially accurate, and it is noted that the present Application is a "continuation-in-part" of the '940 Patent. The Examiner also states: "Claim 10 of the ['940] patent teaches the use of a by-pass passage to direct the water component or water immiscible fluid to bypass the direct contact heat exchanger". (First Office Action at Section 4, page 3.) While this is also accurate, the claims of the pending Application do significantly more than have the water component or water immiscible fluid by-pass the direct contact heat exchanger.

Instead, the present claimed fuel cell power plant of claim 1 at sub-paragraph (d) includes a "direct contact heat exchanger by-pass system means (200) for directing flow of the water component from the coolant loop (18) directly through the radiator (86) and back to the coolant loop (18) by-passing the direct contact heat exchanger (52)." (The amendatory language is underlined.) Nothing in the '904 Patent shows or suggests that the by-pass coolant passage of claim 10, or any other component can direct the water component or water immiscible fluid to pass directly from the coolant loop into the radiator. Indeed, a review of Figure 1 of the '904 Patent (the only figure of the '904 Patent) clearly shows that the only conduit directing any fluid into the radiator 86 from the coolant loop 18 is a "water immiscible fluid discharge line 88" that directs heated water immiscible fluid from the direct contact heat exchanger into the radiator 86. (See the '904 Patent at Col. 6, lines 26 - 31, and

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Figure 1, at reference numerals 91, 88, 86.) Consequently, it is impossible for any water component or water immiscible fluid to flow within the '904 Patent from the coolant loop 18 and directly through the radiator 86 and back to the coolant loop 18 while by-passing the direct contact heat exchanger 56.

To emphasize that the water component in claim 1 is flowing "directly" from the coolant loop to the radiator and back to the coolant loop, the present amendment to claim has added the word "directly", as shown above. Antecedent basis for that amendment is found in the specification at page 4, lines 24, 25.

Because the '904 Patent does not show or suggest any structure that provides for flow of the water component directly from the coolant loop to the radiator and back to the coolant loop, it is respectfully submitted that claim 1 as amended is not the same invention as claim 10 of the '904 Patent. Therefore, it is requested that the Section 101 rejection of claim 1 be removed.

Next, at section 5 of the First Office Action, the Examiner has rejected claims 6 - 10 on the grounds of nonstatutory double patenting as being unpatentable over claim 1 of the '940 Patent in view of claim 10 of the '904 Patent and in further view of claims 4 - 8 of the Patent. The Examiner urges, as above, that "claim 10 of the ['904] is identical to claim 1 of the instant application (see above). It would have been obvious to one having ordinary skill in the art at the time of the invention to use the water immiscible fluid of claims 4 - 8 of the patent in

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the fuel cell system of claim 10 since the by-pass valve provides improvement to the system but does not affect the water immiscible fluid." (First Office Action at Section 5, page 3.)

Applicants incorporate herein by reference thereto the statements made above with respect to the distinctions between claim 1 as amended of the pending, above referenced Application and claim 10 of the '904 Patent. Applicants reiterate the conclusion that claim 10 of the '904 Patent is not identical to claim 1 as amended, because neither claim 10 nor any other aspect of the '904 Patent show or suggest any structure capable of directing the water component to flow directly between the coolant loop 18, the radiator 86 and back into the coolant loop 18 while by-passing the direct contact heat exchanger 56. Because claim 1 is neither shown nor suggested by the '904 Patent, it is urged that claims 6 - 10 that depend from claim 1 necessarily narrow claim 1, and hence are also therefore patentably distinct from, and certainly not identical to any inventions claimed, disclosed or suggested in the '904 Patent. Consequently, it is urged that the Examiner remove her rejections of claims 6 - 10.

Next, at section 6, the Examiner has rejected method claims 11 and 12 grounds of nonstatutory double patenting as being unpatentable over claim 13 of the '940 Patent. (It is pointed out for efficiency, that claim 13 of the '940 Patent is also a method claim.) Specifically, the Examiner stated that claims 11 and 12 of the pending application are not patentably distinct from claim 13 of the '904 Patent "because claim 13 of the ['904]

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patent teaches directing the coolant flow through the radiator and back through the heat exchanger, or bypassing the heat exchanger (selectively directing flow) at temperatures greater than thirty degrees Celsius." (First Office Action at page 4.) (It is noted that neither claim 13 nor any aspect of the '904 Patent makes any reference to "temperatures greater than thirty degrees Celsius." However, claim 13 of the pending application does. The undersigned suspects this is a minor oversight, and does not substantively distract from the point the Examiner makes.)

As with the Examiner's analysis of claim 1 above, it is again reiterated that in fact the '904 Patent does not show nor suggest any structure that directs a water component of the coolant to flow directly into the radiator and back through the heat exchanger. In contrast to the '904 Patent, the invention of independent method claim 11 requires "selectively directing flow of the water component from the coolant loop (18) directly through the radiator (86) and back to the coolant loop (18) bypassing the direct contact heat exchanger (56)." (The amendatory "directly" is underlined, and antecedent basis for the amendment is found in the Specification at page 4, line 25, as recited above.)

Applicants incorporate by reference thereto the statements made above that clarify that the '904 Patent neither shows nor suggest any step or structure that provides for directing flow of the water component directly from the coolant loop 18 through the radiator 86 and back to the coolant loop 18. Therefore, it

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is respectfully requested that the Examiner remove her rejections of claim 11 and 12 because they are not the same invention or obvious variations of the invention disclosed in claim 13 or any other aspect of the '904 Patent.

To further clarify distinctions over the '904 Patent, Applicants have added a new dependent method claim 14. It recites that the step of "selectively directing flow of the water component from the coolant loop (18) directly through the radiator (86)", includes "the further step of turning off the radiator pump (92)". Antecedent basis for that amendment is found in the Specification at page 15, lines 30 - 32. Because there is no need for use of the direct contact heat exchanger 56 during the by-pass by the water component, the radiator pump need not be operated. Certainly, nothing in the '904 Patent shows or suggests that step. Hence, it is urged that new claim 14 is allowable.

In addition, it is noted that the Examiner has not rejected dependent claims 2 - 5 under any 35 U.S.C. section 101 "identical invention" double patenting bases. Claims 2 - 5 were rejected under 35 U.S.C. Section 112 second paragraph as being indefinite. However, as recited above, the Applicants have accepted the Examiner's suggested changes to remove that basis for rejection. To further clarify distinctions over the cited prior art, and to make sure some of the amended claims are therefore allowable, Applicants have added a new set of claims 15 - 18. New claims 15 - 18 simply incorporate the non-double patenting rejected claims 2 - 5 with original claim 1. In other

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words, new claim 15 is original claim 1 including the limitations of claim 2. New claim 16 depends from claim 15, and includes the limitations of original claim 3. New claim 17 depends from claim 15, and includes the limitations of original claim 4. Finally, new claim 18 depends from claim 16, and includes the limitations of original claim 5. It is urged that because original dependent claims 2 - 5 were not rejected on a double patenting basis, new claims 15 - 18 must therefore be allowable.

III. CONCLUSION

It is submitted that by the argument above amendments to the above pending original claims, all of the Examiner's concerns regarding those original claims have been resolved. In addition, for the reasons recited above, new claims 14 - 18 are also urged to be allowable. Accordingly, it is respectfully requested that the rejections of the pending claims 1 - 13 be removed, all pending claims be deemed allowable, and a Notice of Allowance be issued.

Respectfully submitted,
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Date: 6/8/07